

Application No. 10/023,643

- 3 -

RECEIVED
CENTRAL FAX CENTER

SEP 22 2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A method of translating at least one quality of service (QoS) parameter related to a ~~first cell-based~~ an ATM transmission protocol from said ~~first cell-based~~ ATM transmission protocol to a ~~second~~ MPLS transmission protocol for a ~~data element~~ an ATM cell being sent on a connection from a ~~first cell-based~~ an ATM communication network utilizing said ~~first~~ ATM transmission protocol to a ~~second~~ MPLS communication network utilizing said ~~second~~ MPLS transmission protocol, said method comprising:

mapping said at least one QoS parameter to a class of service value for said connection;

mapping said class of service value and a drop precedence value of the data element to another parameter indicating a quality of service provisioning for said ~~second~~ MPLS transmission protocol;

converting said ~~data element~~ ATM cell of said connection to a ~~second data element~~ MPLS frame associated with said ~~second~~ MPLS transmission protocol; and

incorporating said another parameter into said ~~second data element~~ MPLS frame for transmission of said ~~second data element~~ MPLS frame in the ~~second~~ MPLS network with the ~~second~~ MPLS transmission protocol,

wherein:

said at least one QoS parameter further includes a priority rating for MPLS frame and at least one of ATM service category, cell loss ratio and cell delay variation;

said another parameter indicates drop precedence for said MPLS frame in said MPLS communication network; and

said MPLS frame is provided to said MPLS network for transmission through a label switched path and said another parameter is inserted in an experimental field of said MPLS frame.

2 - 9. (Cancelled)

123081-339668
TDO-RED #8337053

Application No. 10/023,643

- 4 -

10. (Currently Amended) A method of translating at least one QoS parameter as claimed in claim [[7]] 1, wherein said label switched path is an experimental inferred per hop behaviour label switched path (E-LSP).

11. (Currently Amended) A method of translating at least one QoS parameter as claimed in claim [[26]] 1, wherein ~~said second communication network is a MPLS network, said second transmission protocol is a MPLS transmission protocol, said second data element is a MPLS frame, said first communication network is an ATM network, said first transmission protocol is an ATM transmission protocol, each of said at least one first data element is an ATM cell, said second parameter indicates drop precedence for said ATM cell, said another transmission parameter indicates drop precedence for said MPLS frame, said MPLS frame is provided to said MPLS network for transmission through label switched path is a label inferred per hop behaviour label switched path (L-LSP) and said another parameter is inserted in an experimental field of said MPLS frame.~~

12. (Previously Presented) A translation module of a network element, said translation module translating at least one quality of service (QoS) parameter related to ~~a first cell-based an~~ an ATM transmission protocol from said ~~first cell-based ATM~~ transmission protocol to a ~~second MPLS transmission protocol for a data element an ATM cell~~ being sent on a connection from a first an ATM communication network utilizing said first ATM transmission protocol to a second MPLS communication network utilizing said second MPLS transmission protocol, said network element connected to said ~~first ATM~~ communication network and said ~~second MPLS~~ communication network, said network element receiving said ~~data element ATM cell~~ from said first ATM communication network and communicating said ~~data element ATM cell~~ to said translation module, said network element transmitting said ~~data element ATM cell~~ from said network element over said second MPLS communication network after translation of said at least one QoS parameter, said translation module comprising:

- a control complex providing management for said network element, said control complex containing a first sub-module mapping said at least one QoS parameter to a class of service value for said connection;
- a MPLS card connected to said control complex, the MPLS card containing:

123081-339668
TDO-RED #8337053

Application No. 10/023,643

- 5 -

a second sub-module mapping said class of service value and a drop precedence value of the ~~data element~~ ATM cell to another transmission parameter indicating a quality of service provisioning for said ~~second~~ MPLS transmission protocol;

a conversion sub-module, said conversion sub-module:

converting said ~~data element~~ ATM cell of said connection to a ~~second data element~~

MPLS frame associated with said ~~second~~ MPLS transmission protocol; and

incorporating said another transmission parameter into said ~~second data element~~

MPLS frame for transmission of said ~~second data element~~ MPLS frame in the

~~second~~ MPLS network with the ~~second~~ MPLS transmission protocol,

wherein:

said at least one QoS parameter further includes a priority rating for said ATM cell and at least one of ATM service category, cell loss ratio and cell delay variation;

said another transmission parameter indicates drop precedence for MPLS frame in said MPLS communication network; and

said network element includes an ATM card, said ATM card providing an interface for said ATM network, said ATM card receiving said ATM cell from said ATM network and communicating said one ATM cell to said translation module, said ATM card is a line card, said MPLS card is a line card, said MPLS card providing an interface for said MPLS network and said MPLS card transmitting said MPLS frame over said MPLS network.

13 - 18. (Cancelled)

19. (Currently Amended) A translation module of a network element as claimed in claim [[18]] 12, wherein said network element transmits said MPLS frame over said MPLS network through a label switched path and said another transmission parameter is inserted in an experimental field of said MPLS frame.

20. (Cancelled)

21. (Cancelled)

123081-339668
TDO-RED #8337053

Application No. 10/023,643

- 6 -

22. (Previously Presented) A translation module of a network element as claimed in claim 19, wherein said label switched path is an experimental inferred per hop behaviour label switched path (E-LSP).

23. (Currently Amended) A translation module of a network element as claimed in claim [[27]] 19, wherein said ~~second communication network is a MPLS network, said second transmission protocol is a MPLS transmission protocol, said second data element is a MPLS frame, said first communication network is an ATM network, said first transmission protocol is an ATM transmission protocol, each of said at least one first data element is an ATM cell, said second parameter indicates drop precedence for said ATM cell, said another transmission parameter indicates drop precedence for said MPLS frame, said MPLS frame is provided to said MPLS network for transmission through label switched path is a label inferred per hop behaviour label switched path (L-LSP) and said another transmission parameter is inserted in an experimental field of said MPLS frame.~~

24. (Previously Presented) A method of formatting a MPLS packet to support a quality of service (QoS) parameter related to at least one ATM cell when said MPLS packet is transmitted on a MPLS communication network, said method comprising:

mapping said QoS parameter to a class of service value for a MPLS connection for said MPLS packet;

mapping said class of service value to another parameter indicating a quality of service provisioning for said MPLS communication network;

inserting said class of service value into a experimental field of a header of said MPLS packet; and

inserting contents of said ATM cell in said MPLS packet,

wherein said QoS parameter indicates drop precedence for the at least one ATM cell and the another parameter further indicates drop precedence for said second data element in said MPLS communication network, said drop precedence of said at least one ATM cell utilizes a value of drop precedence for each of said at least one ATM cell, and said QoS parameter includes a priority rating for the at least one ATM cell and at least one of a service category, cell loss ratio and cell delay variation.

123081-339668
TDO-RED #8337053

Application No. 10/023,643

- 7 -

25. (Previously Presented) A method of routing at least one ATM cell through a MPLS network, said method comprising:

mapping a quality of service (QoS) parameter related to the at least one ATM cell to a class of service value for a MPLS connection for said MPLS network;
mapping said class of service value to another parameter indicating a quality of service provisioning for said MPLS communication network;
creating a MPLS packet;
inserting class of service value into a experimental field of a header of said MPLS packet;
inserting contents of said at least one ATM cell in said MPLS packet;
routing said MPLS packet through one or more router in said MPLS communication network according to contents of said another parameter,

wherein

said QoS parameter indicates drop precedence for the at least one ATM cell and the another parameter further indicates drop precedence for said second data element in said MPLS network, said drop precedence of said at least one ATM cell utilizes a value of drop precedence for each of said at least one ATM cell, and said QoS parameter includes a priority rating for the at least one ATM cell and at least one of a service category, cell loss ratio and cell delay variation; and
said contents of said another parameter specify experimental (EXP) inferred label switched path scheduling treatment and drop precedence treatment.

26 - 27. (Cancelled)

28. (New) A method of transporting data traffic of a first transmission protocol through an MPLS network from an edge network element connected to an ingress point of the MPLS network to an egress point of the network, while maintaining a quality of service (QoS) of the data traffic, the method comprising:

providing a mapping table with correspondence between a plurality of QoS parameters relating to the data traffic arriving at the edge network element and a plurality of classes of service

123081-339668
TDO-RED #8337053

Application No. 10/023,643

- 8 -

for MPLS frames generated from the data traffic at said edge device for transmission through the MPLS network, each one of the plurality of classes of service for maintaining a QoS of its corresponding QoS parameter in the MPLS network;

identifying a QoS parameter of a data element of the data traffic arriving at the edge device over a connection and encapsulating the data element into a MPLS frame;

consulting the mapping table to identify one class of the plurality of classes of service corresponding to the QoS parameter of the data packet and inserting a class of service identifier associated with the one class into an unused field of the outer label of the MPLS frame carrying the data element; and

transporting the MPLS frame across the MPLS network, the MPLS frame identifying the one class of service of the data element in the MPLS frame to maintain the OoS of the data traffic.

29. (New) The method of claim 28, wherein the unused field is the EXP field of the MPLS frame.

30. (New) The method of claim 29, wherein the first transmission protocol is ATM, the data element is an ATM cell, and the QoS parameter includes a drop precedence parameter taken from a CLP bit of the ATM cell.

31. (New) The method of claim 30, wherein the QoS parameter includes a scheduling priority parameter for the ATM cell.

32. (New) The method of claim 31, wherein the ATM cell arrives at the edge network element in an ATM connection, and the OoS parameter identifies: a service category for the ATM connection; a cell loss ratio (CLR) for the ATM connection; and a cell delay variation (CDV) for the ATM connection.

123081-339668
TDO-RED #8337053

Application No. 10/023,643

- 9 -

33. (New) The method of claim 32, wherein for the mapping table, each of the plurality of QoS parameters defines properties relating to at least one of an ATM service category, a CLR and a CDV.

34. (New) The method of claim 33, wherein each of the plurality of classes of service for MPLS frames is one of eight classes, and the mapping table defines a correspondence between:

a first class to: the properties including an ATM service category of constant bit rate (CBR); or the properties including an ATM service category of real-time variable bit rate (rtVBR) and $250\mu s \leq CDV < 2,500\mu s$;

a second class to the properties including an ATM service category of real-time variable bit rate (rtVBR) and $2,500\mu s \leq CDV < 10,000\mu s$;

a third class to the properties including an ATM service category of non-real-time variable bit rate (nrtVBR) and a CLR of 10^{-7} ;

a fourth class to the properties including an ATM service category of non-real-time variable bit rate (nrtVBR) and a CLR of 10^{-6} ;

a fifth class to the properties including an ATM service category of non-real-time variable bit rate (nrtVBR) and a CLR of 10^{-5} ;

a sixth class to the properties including an ATM service category of non-real-time variable bit rate (nrtVBR) and a CLR of 10^{-1} to 10^{-4} ;

a seventh class to the properties including an ATM service category of available bit rate (ABR); and

an eighth class to the properties including an ATM service category of unspecified bit rate (UBR), a CLR of any value, and a CDV of any value.

35. (New) The method of claim 34, wherein the QoS parameter includes a cell loss priority (CLP) bit, and:

123081-339668
TDO-RED #8337053

Application No. 10/023,643

- 10 -

if the CLP bit is 0, then the class of service identifier includes a value "1" inserted into the EXP field of the MPLS frame; and

if the CLP bit is 1, then the class of service identifier includes a value "2" inserted into the EXP field of the MPLS frame.

36. (New) A method of translating at least one quality of service (QoS) parameter related to a first cell-based transmission protocol from said first cell-based transmission protocol to a second transmission protocol for a data element being sent on a connection from a first cell-based communication network utilizing said first transmission protocol to a second communication network utilizing said second transmission protocol, said method comprising:

- mapping said at least one QoS parameter to a class of service value for said connection;
- mapping said class of service value and a drop precedence value of the data element to another parameter indicating a quality of service provisioning for said second transmission protocol;
- converting said data element of said connection to a second data element associated with said second transmission protocol; and
- incorporating said another parameter into said second data element for transmission of said second data element in the second network with the second transmission protocol.

* * * * *

123081-339668
TDO-RED #8337053